Grupo ACUSTER

USER MANUAL

ELECTROFUSION CONTROL BOX
MODELS BEAT-MV / BEAT-2

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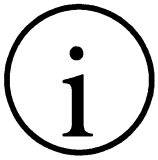


NOTE !
At the time of the publication of this *User Manual*, the software version is **V. 1.25**. ‖
The modifications carried out against the previous revision of this publication are indicated with ‖ on the right margin.

CONTENTS:

Page:

CHAPTER 1: INTRODUCTION..... 5
1.1 General..... 5
1.2 Design Specifications..... 6
1.3 General Information..... 6
1.4 Unit Identification..... 7
1.4.1 Serial number stamping..... 7
1.4.2 CE making..... 7
1.5 Measures of protection against accidents..... 8
1.5.1 Safety alert symbols..... 8
1.5.2 Safety measures and dangers..... 8
1.6 Declaration “CE” of conformity..... 10
1.7 Guarantee..... 11

CHAPTER 2: DESCRIPTION OF THE ELECTROFUSION UNIT..... 12
2.1 General..... 12
2.2 Front..... 13
2.3 Right side..... 13
2.4 Left side..... 14
2.5 Top side..... 14

CHAPTER 3: MODE OF USE..... 15
3.1 Electrofusion procedure..... 15
3.1.1 Scraping pipe surfaces..... 15
3.1.2 Fitting installation..... 15
3.1.3 Unit connection..... 16
3.1.4 Using the Barcode reader..... 18
3.1.5 Fitting connection..... 19
3.1.6 Entering electrofusion data in the unit..... 19
3.1.7 Electrofusion process..... 21
3.1.8 Cooling time..... 22
3.2 Access to other menus..... 23
3.2.1 Available options..... 23
3.2.2 INFO option..... 23
3.2.3 SETUP option..... 24
3.2.4 LAST REVISION option..... 24
3.2.5 SERVICE option..... 24

Page:

CHAPTER 4: TROUBLESHOOTING..... 25
4.1 General..... 25
4.2 Display error messages..... 25
4.2.1 Input voltage/frequency..... 25
4.2.2 Fitting resistance outside margin..... 26
4.2.3 Interruption by operator..... 26
4.2.4 Output current..... 26
4.2.5 Electrofusion output voltage..... 27
4.2.6 Protection against internal temperature..... 27

CHAPTER 5: MAINTENANCE..... 28
5.1 General..... 28
5.1.1 Introduction..... 28
5.1.2 Storage..... 28
5.1.3 Cleaning..... 28
5.1.4 Checks..... 28
5.2 Control unit..... 29
5.2.1 Electronic control unit..... 29
5.2.2 Updating the programme software..... 29

CHAPTER 6: TECHNICAL CHARACTERISTICS..... 30
6.1 Electrofusion control unit..... 30
6.1.1 General specifications..... 30
6.1.2 Generator specifications..... 31
6.2 Size and weight..... 31
6.2.1 Weights and dimensions..... 31
6.2.2 Accessories..... 31

CHAPTER 1: INTRODUCTION

1.1 GENERAL

The electrofusion units **BEAT-MV** and **BEAT-2** are designed to carry out polyethylene (PE) or polypropylene (PP) pipe/fittings joints through electrofusion fittings with a range of 8 V to 48 V electrofusion voltage.
This *User Manual* corresponds to the following models:

BEAT-MV Electrofusion unit which the electrofusion parameters are entered manually. No traceability.

BEAT-2 Electrofusion unit that the electrofusion parameters can be entered manually or by barcode system. No traceability.

The **BEAT-MV** electrofusion unit receives the relevant data of the fitting via operator's manual introduction: VOLTAGE and TIME from the fitting manufacturer. Take into account that some fitting manufacturers provide different fusion times according to ambient temperature. Refer to the fitting manufacturer's instructions.

The **BEAT-2,** in addition of the data manual input is also able to enter the electrofusion parameters by means of a barcode automatic recognition system.

These models can be optionally supplied as **AR** Series (High Performance) with the same original technical specifications, except for having a higher duty cycle. The **AR** series is especially indicated for ongoing electrofusion of large size fittings and for very hot climates.

The technical data contained in this *Manual* are purely informative and may be changed at anytime. ACUSTER BAHISA, S.L.U. declines all responsibility for claims arising from misuse of the data contained herewith and/or errors or omissions detected after publication.
This *Manual* must be considered as part of the unit.

1.2 DESIGN SPECIFICATIONS

The electrofusion units **BEAT-MV** and **BEAT-2** are designed according to the following specifications:

- ISO 12176-2 — Equipment for fusion jointing polyethylene systems. Part 2: Electrofusion.
- ISO/TR 13950 — Plastic pipes and fittings: automatic recognition of electrofusion systems.

The **BEAT-2** accepts all the identifications which correspond to the above listed Specifications. All the fittings can be fused by electrofusion if the manufacturer encloses the programmed bar code system in accordance with ISO/TR 13950.

1.3 GENERAL INFORMATION

The development, documentation, production, tests and shipping of the products herewith described have been made:

- Complying with the respective safety rules, and
- In accordance with the requirements of quality guarantee.

WARNING !
The electrofusion control box can only be opened by the Grupo Acuster's After-sales Service. In the case of the back cover opening or coming apart, parts of electrical components which are not covered may be left exposed.
Only qualified personnel are authorised to intervene both for fusion and repairs. These qualified personnel must be familiar with all the safety measures, potential dangers and maintenance rules described in this *Manual*.
The safe use of the products described requires an appropriate means of transport, storage, installation and use, a careful handling and the preestablished periodical maintenance follow-up.

1.4 UNIT IDENTIFICATION

1.4.1 **Serial Number Stamping:**

The electrofusion units **BEAT-MV** and **BEAT-2** are identified by means of their own identification plate.

QUALITY CONTROL

MACHINE No.

MAINTENANCE REVISIONS

MANUFACTURER'S ADDRESS

ACUSTER BAHISA
CONTROL DE CALIDAD
EQUIPO Nº
REVISIONES
Juan de la Cierva, 1 - Políg. Ind. nº 1
Telf. +34 93 4703070 - Sant Just Desvern (Barcelona)

Figure 1

The quality control identification plate includes the fusion control box serial number. The plate includes room for future maintenance date stamping.

1.4.2 **"CE" marking:**

The electrofusion unit is supplied with the appropriate plate with the "CE" mark, as the European Community norm indicates on the new Machine Security Regulation (Board 98/37/CE, dated 22nd June 1998).

ACUSTER BAHISA
C E
MODELO:
Nº SERIE
Juan de la Cierva, 1 - Políg. Ind. nº 1
Telf.+34 93 4703070 - Sant Just Desvern (Barcelona)- SPAIN

Figure 2

1.5 MEASURES OF PROTECTION AGAINST ACCIDENTS

1.5.1 **Safety alert symbols:**

This User Manual employs the following safety alert symbols:

Indicates information, considered important, but not hazard-related.

When appears this hazard alert sign in this manual, carefully read what is says.

Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

1.5.2 **Safety measures and dangers:**

Please go by the following safety measures:

- Keep the fusion control box out of the reach of non authorised personnel, non qualified personnel and children. Protect the control unit from water, rain, snow, etc.
- When transporting the unit, and during loading and unloading operations, the appropriate precautionary measures must be taken to ensure that all unit components are completely secured in the vehicle, and that they are free from impact during transportation.
- Protect the electrofusion cables and the cable that goes to the power supply of cutting objects.
- All damaged cables must be replaced immediately by the After-Sales Service of Grupo Acuster.
- Always plug the control box to a power supply provided with differential and ground connection.
- Do not expose the fusion control box to heavy weights. All slight damage caused to the external frame or to other elements will have to be replaced immediately by the After-Sales Service of Grupo Acuster.

- The fusion control boxes which are not being used must be kept out of the reach of the non authorised personnel. They will have to be kept in rooms of low humidity degrees and of restricted access.

- Always use adequate working clothes.
  For outside work, it is recommended to use rubber gloves and boots with insulating soles (in wet areas, this advice is essential), and other applicable personal protective equipment such as hard hat, safety glasses, etc.
  For indoor fusion jointing work, adequate ventilation of the premises must be provided.

- Before using the fusion control box, its external condition will have to be checked, as well as its working condition. All components must be correctly assembled in order to guarantee the correct functioning of the unit.

- The damaged components must be repaired or replaced by the After-Sales Service of Grupo Acuster.

- The fusion control box can only be opened by the After-Sales Service of Grupo Acuster.

- Should the fusion control box not work properly, it will have to be sent immediately to the After-Sales Service of Grupo Acuster.

1.6 DECLARATION "CE" OF CONFORMITY

ACUSTER BAHISA, S.L.U.
Juan de la Cierva, 1
Polígono Industrial del Sud-Oest
08960 Sant Just Desvern (Spain)

declare under our sole responsibility that the electrofusion units **BEAT-MV** and **BEAT-2**, to which this declaration relates is in conformity with the following Directives and also the following relating standards:

Directive	Related Specification	Model
2006/95/CEE *Low Voltage*	EN 60335-1	**BEAT-MV & BEAT-2**
2004/108/CEE *Electromagnetic compatibility*	EN 61000-6-2; EN 61000-6-3	
	ISO 12176-2	
	ISO/TR 13950	**BEAT-2**

Sant Just Desvern, 20th September 2012

Jaume Puig
General Manager

1.7 GUARANTEE

Guarantee Declaration:

All the electrofusion units **BEAT-MV** and **BEAT-2** are manufactured from high quality material and have been subjected to rigorous tests for resistance and working order as well as passing all the quality control tests required by the applicable normative (see "CE" Declaration of conformity).
Regardless of whether an incident might occur during the period of guarantee, we recommend careful reading of the following general guarantee conditions.

General conditions of Guarantee:

1. ACUSTER BAHISA, S.L.U. guarantees that this product has no manufacturing defect at the time of its purchase and extends this guarantee for the period of TWO years.

2. If the product proves defective during this period, due to the materials or its assembly, it will be repaired free of charge, including the cost of materials and labour at Grupo Acuster's Technical Service.

3. The Guarantee is not valid in the following cases:

   When the fault in the product is a result of:

   - Abuse or incorrect use of the unit
   - Not following the instructions specified in this *User Manual* for connecting to a group generator.
   - Repairs carried out without authority from Grupo Acuster (the taking apart or breaking of the unit's seal immediately renders the guarantee invalid).
   - Accidents, natural disasters (including lightning, water action etc) as well as any cause beyond Grupo Acuster's control.

4. In all claims against this guarantee, information relating to the model, date of purchase, Serial number and any other additional information must at all times be stated.

CHAPTER 2: UNIT'S DESCRIPTION

2.1 GENERAL

The electrofusion units **BEAT-MV** and **BEAT-2** are made up of a metal casing, a master switch, the mains and electrofusion cables. Additionally the **BEAT-2** is fitted with a d-sub connector for the connection of scanner and PC.
The front part is formed by a membrane which incorporates tactile push-buttons to enter the data and a back-lit LCD display.
Inside, the unit is formed by a processor board (CPU), transformer, in addition to all of the electronics necessary for the electrofusion process, current and voltage controls.

*Figure 3a: **BEAT-MV** general view*

*Figure 3b: **BEAT-2** general view*

2.2 FRONT

The front part of **BEAT-MV** and **BEAT-2** electrofusion unit is formed by a silkscreened plastic membrane which incorporates membrane type tactile push-buttons. The display is located on the upper left side.

Where:

1 Membrane with push-buttons
2 Display
3 Master switch
4 Connector D-sub 9 pins (**BEAT-2**)
5 Adhesive of model: **MV** or **2**

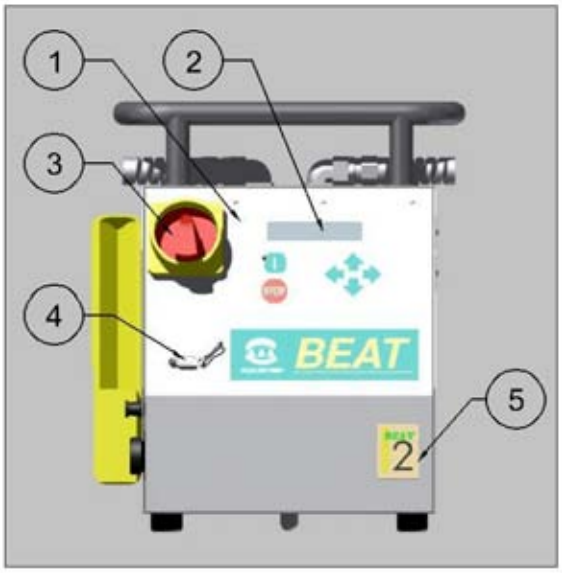


Figure 4

2.3 RIGHT SIDE

On the right side of the **BEAT-MV** and **BEAT-2** electrofusion unit (looking at it from the front), the following elements are located:

1 Technical specifications sticker
2 "CE" plate
3 Service revisions plate

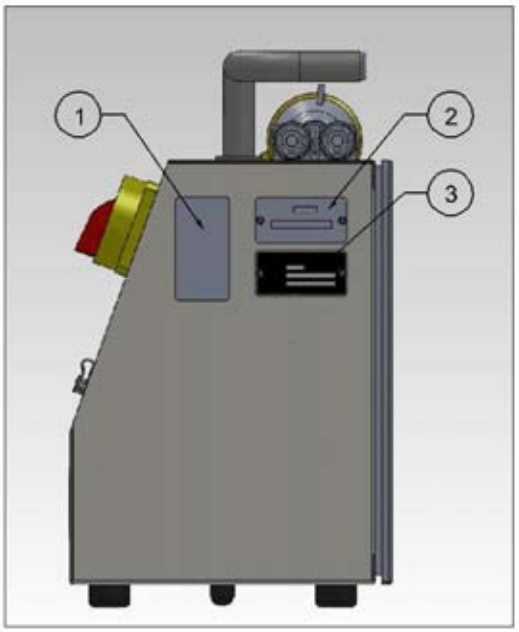


Figure 5

2.4 LEFT SIDE

On the left side of the **BEAT-MV** and **BEAT-2** electrofusion unit (looking at it from the front), the following elements are located:

1 Document holder bag (**BEAT-2**)
2 RT sensor
3 Buzzer

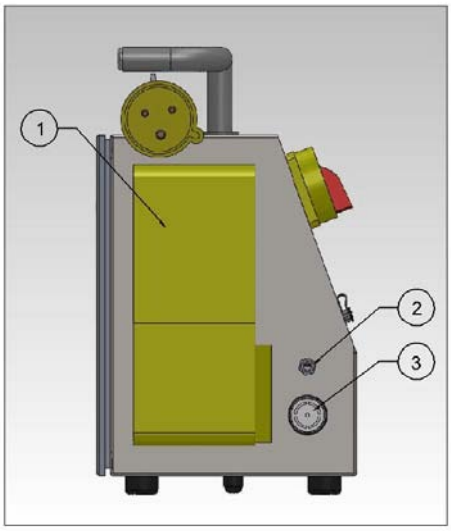


Figure 6

2.5 REAR

At the top of the **BEAT-MV** and **BEAT-2** are located the following components.

1 Transport handle
2 Power cable
3 Electrofusion cables

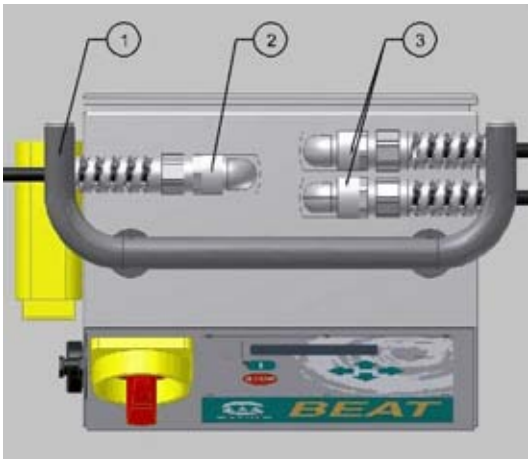


Figure 7

CHAPTER 3: MODE OF USE

3.1 FUSION PROCEDURE FOR ELECTROFUSION FITTINGS

3.1.1 **Scraping pipe surfaces:**

First clean the surface to be scraped with a clean lint-free dry cloth. The length to be cleaned will depend on the size of the fitting to be used, adding a minimum additional margin of 50 mm on each end.
Scrape the area of the pipe or pipes where the fitting to be joined will be installed. The length of the scraping should be greater than that of the fitting.

IMPORTANT !
The scraping of the pipe should generate swarfs. This ensures the elimination of the pipe's most exterior oxidation, which would otherwise lead to a dissatisfactory electrofusion joint.

Next clean the scraped area with a degreasing towel or with a clean, dry white cloth (which does not shed lint), dampened with isopropanol or recommended PE solvent.

3.1.2 **Fitting installation:**

For joints of *tapping saddles* and *branch saddles*, place a rounder on each side of the scraped area if the fusion is performed over a bar pipe. If the joint is performed over a pipe from a roll, the placement of an aligner-rounder tool is indispensable. Next install the fitting over the pipe.

If the fitting to be jointed is a *coupler*, *reducer* or *elbow*, remove it from its wrapping, and without touching its interior, install it on the scraped and cleaned pipe. Now assemble the aligner and the other specially-prepared pipe or fitting.
Electrofusion joints should only be carried out by qualified staff.

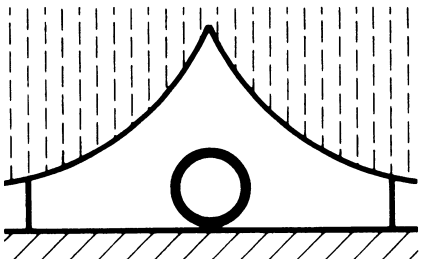


Figure 8

Protect the area where electrofusions area carried out from adverse weather conditions, such as rain, snow or wind. Admissible temperatures range from -5°C to +45°C. In order to achieve a uniform temperature in the whole diameter of the pipes, protect the fusion area against sunrays or bad weather.
The quality of the joint depends substantially on the care taken in the previous preparation tasks (scraping, degreasing, etc).

3.1.3 **Unit connection:**

⚠ DANGER Connect the unit to a 230 V ± 15%/50-60 Hz mains source (or to a 110 V, according to market requirement) of alternating current. For generator group specifications, please refer to *CHAPTER 6: TECHNICAL CHARACTERISTICS*.

IMPORTANT NOTES !
Connection to a generator: the generator electric connection where the control box mains is plugged must be normalized and fitted with differential and ground pin. Refer to the generator's User Manual. **Connection to the mains:** the building electric installation where the control box mains is plugged must be fitted with earth connection as well as circuit breaker.
Do not unplug the mains pulling from the cable.
BEAT-2: connect the scanner before switching on the unit.
Checking the fitting connection cable terminals before starting up the unit is advised. There are different types of adopters depending on the type pf fitting to be used.

❶ Set the master switch in the ON position.

BEAT-XX No.xxxx **V v.vv UK dd/mm/yy**

The display backlight will be enable, an acoustic signal heard and the following information will appear:

BEAT-XX: model, BEAT-MV or BEAT-2
No.xxxx: unit serial number
V v.vv: software version
UK: Letters of the active language
dd/mm/yy: current date

Once the display time has elapsed (3 seconds), the unit will display the following screen.

Possible initial messages:

TECHNICAL MACHINE SERVICE

If the programmed warning date for the Technical Machine Service in the unit has expired, the display will show:

REV. VALID UNTIL **dd/mm/yy**

The unit will emit an acoustic signal and a message will appear in the display along with the date of the next check.

If the date **dd/mm/yy** has not expired yet, press START to confirm and proceed to the next screen (regardless of the existing locking set up of the unit).

If the date **dd/mm/yy** has already expired but the unit is set up without locking, by pressing START you will be able to move to the next screen. However, if the unit is set up with locking subsequently the unit will not be able to be used until the TMS has been carried out.

AMBIENT TEMPERATURE OUT OF RANGE

If the ambient temperature is not within -20°C and 50°C [from software version v. 1.21 (previous software versions -15°C and 50° C)] or the temperature sensor is defective, with data entry via bar code the following message will be displayed:

TEMPERATURE **OUT OF RANGE**

Pressing the key START/VALIDATE automatically switches to manual mode.

NOTE: In the case of faulty probe, send the unit to the Grupo Acuster's After-sale Service.

INTERNAL FAULT

If the software detects that there is a voltage output through the electrofusion cables out of the electrofusion cycle, the display shows the following message:

SERIOUS TROUBLE **TURN OFF UNIT**

The unit will be blocked and the buzzer will be permanently activated. Switch off immediately the unit.

NOTE: If case to have an electrofusion fitting connected, check if it has suffered damage. Send the unit to the Grupo Acuster's After-sale Service.

LOW BATTERY

In case to detect a battery voltage below the minimum required, the display will indicate:

SERVICE **FLAT BATTERY**

Send the unit to the Grupo Acuster's After-sale Service for the replacement of the battery.

Pressing the START button, the display shows the date and time to update it (refer to paragraph **DATE/TIME** of section 3.2.4 of this *Manual*). This update will keep for some time if the battery is not replaced, especially with the unit disconnected from the mains.

From the time the unit is started up, a verification of the input voltage is performed. If the voltage registered by the unit is above or below the tolerance allowed (195-265 V for nominal 230Vac and 90-140 V for nominal 110Vac), one of the following messages will appear on the display:

POWER SUPPLY ERROR **265/140V 65Hz**

Appears when the input voltage or frequency is over 265/140 Vac and 65 Hz, respectively.

POWER SUPPLY ERROR **195/90V 45Hz**

Appears when the input voltage or frequency is under 195/90 Vac and 45 Hz, respectively.

Check the power supply (generator) and correct the defect. It is not necessary to switch the unit off and switch it on again to refresh the input voltage.

3.1.4 **Using the Barcode Reader (BEAT-2):**

If you read the different data (operator's ID, job ID, fittings, pipe, etc) by using optical means (scanner), connect the reader device into the corresponding connector and put it in front of the barcode data.

ATTENTION !

The scanner should be correctly setup. In case no data is captured by the device, carry out the following barcode reading.

Software version ≤ v. 1.23

Software version ≥ v. 1.24

Laser scanner: When reading, the connected scanner emits a red laser line of a particular length. To capture the barcode data, place the scanner so that the laser line coincides longitudinally with the barcode. The distance will depend on the size of the barcode to read. Once the scanner has been placed in position, the laser line will stop flashing and remain fixed. When this happens, press any of the three buttons on the top of the scanner.

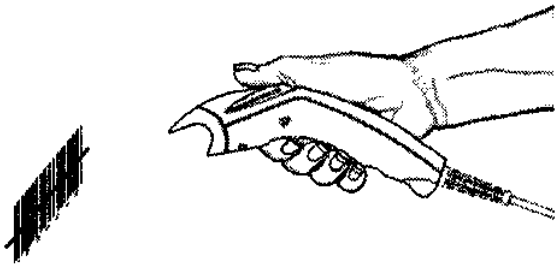


Figure 9: Example of using the laser scanner

3.1.5 **Fitting connection:**

Connect the unit cable connectors in the fitting terminals to be jointed. The contact surfaces of both the fitting's terminals and the cable connectors must always be clean.

NOTE !	
We advise you to always use adapters, even though the connection to the fitting may be made directly. Doing so, the cable terminals are protected, do not wear out, burn, etc.	
It is recommend refraining from electrofusion if the exterior temperature is below -10°C or above +45°C.	

3.1.6 **Entering electrofusion data in the unit:**

❷ **BEAT-MV / BEAT-2:** *Entering joint data without barcode: via the keyboard.*

BEAT-2 only: Click one of the 4 arrows. The display will show the following screen:

BEAT-2 23°C **FUSION DATA?**

Where 23°C corresponds to the ambient temperature (informative).

Enter voltage. Press the ➡ and ⬅ arrows to move the cursor to a different field and the ⬆ and ⬇ arrows to select the values.

FUSION DATA: 23°C **VOLTAGE(Volt): 40.0**

40.0 Volt by default.

The electrofusion voltage should be between 8 and 48 V.

Press START/VALIDATE to pass to the next screen.
Enter the time indicated by the fitting manufacturer, bearing in mind the correction given according to the ambient temperature (according to the manufacturer). Press the ➡ and ⬅ arrows to move the cursor to a different field and the ⬆ and ⬇ arrows to select the values.

FUSION DATA: 23°C **TIME(s): 000**

"0000" by default.

Maximum permitted time of 5940 seconds (99 minutes).

Press START/VALIDATE to pass to the next screen.

SCRAPED & CLEANED ? **<YES>**

Does not contemplate it being <NO>.

Click the START/VALIDATE key. The following message will appear:

PRESS <START> TO BEGIN

Click the START/VALIDATE key to hear an acoustic signal and the electrofusion cycle will begin.

② **BEAT-2:** *Reading the fitting's barcode using the scanner.*

Read the fitting's barcode with the scanner connected to the serial connector.

WARNING !
Make sure you always read the barcode corresponding to the fitting to be electrofused. Should you not record the fitting's data, this could cause errors in the electrofusion process that would have repercussions on the quality and reliability of the joint.

If the barcode or reading were incorrect.

FUSION DATA: WRONG DATA	Error message.

Two acoustic signals are emitted and it returns to the start.
When the data have been satisfactorily captured, the screen will show the following message:

FUSION DATA: I AG d20 40,0V 34s	Information captured.

Where it involves a (I) Agru coupler of diameter 20, 40 Volt and 34 seconds (nominal).

Main symbols used (for the full list, please see ISO/TR 13950):

I	Monofilar coupler	**Y**	Reducer
.t.	Saddle	**T**	Tee
[	Single socket	**C**	Elbow

Click the START/VALIDATE key to pass to the following screen.

SCRAPED & CLEANED ? <YES>	Does not contemplate it being <NO>.

Click the START/VALIDATE key. The following message will appear:

PRESS <START> TO BEGIN

Click the START/VALIDATE key to hear an acoustic signal and the electrofusion cycle will begin.

⚠WARNING If there is a malfunction in the electrofusion process, hot molten PE/PP can be expelled in rare cases. Therefore, keep at a safe distance from the fusion point during the electrofusion cycle and do not connect any other electric equipment during the process.

3.1.7 **Electrofusion process:**

WARNING !
In order to guarantee a good electrofusion, it is recommendable not to reuse a fitting in which the fusion cycle has been interrupted.

❸ The unit has initiated the electrofusion cycle. The time and countdown till you get to zero will come on the display in seconds. The START/VALIDATE led will flash during the whole cycle.

BEAT-MV/**BEAT-2** (Manual)		**BEAT-2** (Barcode)
ON PROCESS... **vv.vV TTTTs tttts**	The electrofusion cycle is being initiated.	**ON PROCESS... I AG** **d20 40.0V 34s**

Where:
vv.vV: Electrofusion voltage entered.
TTTTs: Electrofusion time entered.
tttts: Countdown of time **TTTT** till zero seconds are come on the display.

Where is referred to an Agru coupler of diameter 20, 40 Volt and 34 seconds.

The input voltage is checked during the start up phase of the electrofusion cycle. During this phase it is considered that the unit – specially for a generator – will stabilize its energy supply. The unit verifies if the input voltage and electrofusion current are within the established range (voltage: 165-265 V for 230Vac or 90-140 V for 110 Vac; current >2A <70A). Once overpassed this initial phase, the above mentioned voltage and current values are continuously checked during the whole electrofusion cycle.

If electrofusion data were entered using a barcode (**BEAT-2** only), the unit should also check that the fitting resistance corresponds to that of the fitting connected and that it is within the tolerances assigned by the manufacturer. This will be done when the unit starts the electrofusion cycle.
If the resistance is not correct, the display will show the following messages, where appropriate:

FAILURE OF FITTING **RESISTENCE TOO HIGH**	When the fitting resistance read by the unit is higher than allowed.
FAILURE OF FITTING **RESISTENCE TOO LOW**	When the fitting resistance read by the unit is lower than allowed.

Check the fitting, connections, etc., and restart the cycle.
When the fusion cycle has ended satisfactorily, the display will show the following message:

BEAT-XX 23ºC **CORRECT FUSION**	The upper message is displayed alternately.	**COOLING TIME 10'** **CORRECT FUSION**

The top line of the display alternately shows the messages listed above (only **BEAT-2** and with an introduction of the electrofusion data via bar code).
Where **23°C** corresponds to room temperature (informative) and **10'** corresponds to the cooling time indicated in the fitting bar code.
The fusion process can be stopped at any time by pressing the STOP key. The cycle will then stop and the display will show the following message:

<STOP> PRESSED **xxxxs**

Where xxxxs is the remaining cycle time at the moment of stopping.

If other incidents occur during the fitting electrofusion process, the process will stop and the corresponding message will be shown on the display. For further information, see CHAPTER 4: TROUBLESHOOTING.

3.1.8 **Cooling time:**

❹ Once the electrofusion cycle is completed satisfactorily, leave a minimum cooling time as provided by the fitting's manufacturer before proceeding to disassemble the equipment. Repeat the procedure described for a new electrofusion process.

3.2 ACCESS TO OTHER MENUS

3.2.1 **Available options:**

You can access other menus by pressing the START/VALIDATE key and then starting up the unit at the main power supply.
There are a total of four menu options: INFO/SETUP/LAST REVISION/SERVICE, accessed by sequentially clicking the ⬇ key. The first screen is:

>INFO **SETUP**	Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

Click on ⬇ to see:

INFO **>SETUP**	Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

Click on ⬇ to see:

SETUP **>LAST REVISION**	Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

Click on ⬇ to see:

LAST REVISION **>SERVICE**	Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

And click ⬇ to once again see the first option.

3.2.2 **INFO option:**

To validate the following INFO menu option,

>INFO **SETUP**	Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.
V v.vv UK 0000 **LAST SERV: dd/mm/yy**	The display screen shows the following information:

V v.vv is the software version and UK are the letters of the active language.
0000 indicates the set mode, not available for these models (for **BEAT-Tr** only).
dd/mm/yy corresponds to the date of the latest revision made in the unit.
Click <STOP> to exit this option.

3.2.3 SETUP option:

Finally, validate the second and last option of the SETUP menu:

INFO **>SETUP**

Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

This enables access to the following options: LANGUAGE / DATE/TIME.
Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

LANGUAGE **UK**

The display shows the letters of the active language.

Click the ➡ and ⬅ keys to see the other languages loaded in the unit. If you cannot find the language you want, consult with your distributor.
Click the START/VALIDATE key to accept the option. Click <STOP> to exit this option without changing the language.

The following option enables you to update the unit's date and time.

dd/mm/yy **hh:mm**

dd/mm/yy corresponds to the date and hh:mm to the time.

Click the ➡ and ⬅ keys to move the field and ⬆ and ⬇ keys to modify values. Once past the second line, it is not possible to return to the first. You will have to click <STOP> to restart the change of date/time. Click the START/VALIDATE key to accept the option once you have gone over the 5 fields. Click <STOP> to exit this option without making a modification.

3.2.4 LAST REVISION option:

Validate the third menu option of LAST REVISION:

SETUP **>LAST REVISION**

Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

dd/mm/yy	**dd/mm/yy**
dd/mm/yy	**ON/OFF**

The display will show the following information:

It allows to check the date of the last revision (service), the warning date, the date of expiration of the next service and the unit blocking status (OFF or ON) in this order.
Click <STOP> to exit this option.

3.2.5 SERVICE option:

Finally, validate the last menu option of SERVICE:

LAST REVISION **>SERVICE**

Use the ⬆ and ⬇ keys to move to the selected option and validate with the START key.

The last option of the **Setup** is for exclusive use of the Grupo Acuster's after-sales service centres and an access password is required.
To exit from this access to other menus, stop the unit through the general switch.

CHAPTER 4: TROUBLESHOOTING

4.1 GENERAL

All maintenance and repair work of the **BEAT-MV** and **BEAT-2** electrofusion units is to be carried out by qualified personnel. Full guarantees are obtained by shipping the unit to the Grupo Acuster's After-Sales Service, both for the yearly revision and for repairing any fault that may have occurred in the unit.

4.2 DISPLAY ERROR MESSAGES

4.2.1 **Input voltage / frequency:**

The input voltage/frequency is valued differently according to the process being done at the time.

1. *Verification before fusion process:*

   If the input voltage/frequency is outside the established tolerances:
   for nominal 230V: min. 195Vac / max. 265Vac and min. 45Hz / max. 65Hz
   for nominal 110V: min. 90Vac / max. 140Vac and min. 45Hz / max. 65Hz
   The screen will show:

POWER SUPPLY ERROR **194 / 89V 44Hz**	The values the display shows are refreshed and correspond to the real input of the unit.
POWER SUPPLY ERROR **266 / 141V 66Hz**	The values the display shows are refreshed and correspond to the real input of the unit.

2. *Verification during electrofusion:*

   During the fusion cycle the minimum input voltage may be below 195/90 Vac without the process being interrupted, but always so long as the required output current is supplied. Otherwise, the display will show the following message:

POWER SUPPLY ERROR **xxxxs 160 / 80V 42Hz**	Where xxxxs corresponds to the remaining cycle time at the moment of stopping.

   In the example, 160/80V is the minimum voltage detected by the unit.
   This error message also is enabled when the maximum input voltage detected by the unit is higher than 265/140 Vac. Check the power supply (generator), connections, state of fitting, etc. It is not necessary to restart the unit to refresh the input voltage.

4.2.2 Fitting resistance outside margins (BEAT-2):

Once the electrofusion process has begun and where data is captured exclusively by barcodes, if the fitting resistance is higher than the tolerances established by the fitting's manufacturer, the display will show:

FAILURE OF FITTING **RESISTENCE TOO HIGH**

If this message persists, send the unit the After-Sales Service to check the calibration of the resistance measure.

Once the electrofusion process has begun and where data is captured exclusively by barcodes, if the fitting resistance is lower than the tolerances established by the fitting's manufacturer, the display will show:

FAILURE OF FITTING **RESISTENCE TOO LOW**

If this message persists and after checking the that fitting and barcode resistance are correct, send the unit the After-Sales Service to check the calibration of the resistance measure.

4.2.3 Interruption by operator:

If the operator presses the <STOP> key once the electrofusion process has begun, the display will show:

<STOP> PUSHED **xxxxs**	Where xxxxs corresponds to the remaining cycle time at the moment of stopping.

4.2.4 Output current:

If the electrofusion current is excessive, the display will show:

CURRENT TOO HIGH **xxxxs**	Where xxxxs corresponds to the remaining cycle time at the moment of stopping.

This message appears in the following cases:

1. When the connected fitting has a very low resistance, outside the margins.
2. Crossed fitting resistence.

If the electrofusion current is too low, the display will show:

CURRENT TOO LOW xxxxs	Where xxxxs corresponds to the remaining cycle time at the moment of stopping.

This message appears in the following cases:

1. Fitting not connected.
2. Disconnection of the electrofusion terminals.
3. Cut in the filament of the fitting resistance.
4. If the electrofusion current is lower than 2 A.

4.2.5 Electrofusion output voltage:

If there is a deviation of ± 0,5 V in the output voltage during the electrofusion of the fitting, the cycle will stop and the display will show:

VOLTAGE FAILURE **xxxxs**

Where xxxxs corresponds to the remaining cycle time at the moment of stopping.

This message may also appear due to poor fitting application (fitting voltage outside range).

4.2.6 Protection against internal temperature:

If the electrofusion unit is submitted to intensive, prolonged operation, especially with large-diameter fittings with high fusion times, for which the internal temperature may exceed the maximum allowed, the following procedure is established:

1. If after an electrofusion cycle the transformer temperature is higher than 60ºC, the transformer and electronics are protected by an internal temperature sensor which blocks the unit. If this safety device is activated, the electrofusion under way will not be interrupted. The display will show the following message:

TRAFO TEMPERATURE **TOO HIGH **WAIT****

This message will remain on the screen until the internal temperature falls to 55ºC.

2. If during an electrofusion process the transformer temperature reaches 90ºC, the cycle will stop and the unit will remain blocked until the internal temperature falls to 55ºC. The display will show the following message:

TEMPERATURE TOO HIGH **xxxxs**

Where xxxxs corresponds to the remaining cycle time at the moment of stopping.

CHAPTER 5: MAINTENANCE

5.1 GENERAL

5.1.1 Introduction:

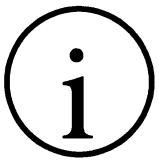
The electrofusion units **BEAT-MV** and **BEAT-2** have been designed and manufactured for a long life service without the need for costly repairs and adjustments. All that is required is careful handling when loading/unloading and during transport, and in general to keep the unit clean by following the recommended preventive maintenance. The costs are very low and are soon written off given that the unit will be fully functional at all times.
This section includes a list of general upkeep and maintenance routine operations. Should any problem arise please refer to CHAPTER 4: TROUBLESHOOTING point in this *User Manual*. However, no action should be taken by unqualified personnel beyond these troubleshooting measures in order not to run the risk of seriously damaging the unit.

5.1.2 Storage:

If the unit is not to be used for a long period of time, keep it in its original packing and protected from dust, moisture, extremes of temperatures, direct sunlight, and so on. The electrofusion control box could be stored either on the warehouse floor or in pallet racks.

5.1.3 Cleaning:

Clean the electrofusion control box regularly using only a damp cloth.



NOTICE !
Do not clean the electrofusion control box with water under pressure, by immersion in water o with compressed air.

Should the unit be very dirty, clean it with a bit of alcohol (do not use solvents or cleaning products containing trichloroethylene).

5.1.4 Checks:

We recommend shipping the electrofusion control unit to the Grupo Acuster's After-Sales Service for a yearly service.

5.2 CONTROL UNIT

5.2.1 **Electronic Control Unit:**

Besides the exterior cleaning of the casing, there is no specific maintenance for the electronic control unit. Tune-ups and adjustments should be performed by qualified personnel, or by the Grupo Acuster's After-Sales Service.

5.2.2 **Updating the Programme Version:**

The updating of the **BEAT-MV** and **BEAT-2** electrofusion unit software must be performed exclusively by the Grupo Acuster's After-Sales Service.

CHAPTER 6: TECHNICAL CHARACTERISTICS

6.1 ELECTROFUSION CONTROL UNIT

6.1.1 General specifications:

	BEAT-MV	BEAT-2
Classification acc. to ISO 12176-2	$P_2 4 US_1 VKX$	$P_2 4 US_1 VKAX$
Configuration options	Language > Multilingual (request available languages)	
	Date / Time	
Input voltage	195 Vac to 265 Vac. Nominal voltage: 230 Vac 90 Vac to 140 Vac. Nominal voltage: 110 Vac	
Input frequency	45 Hz to 65 Hz. Nominal frequency: 50 Hz	
Electrofusion voltage	8 to 48 Vac galvanically separated	
Power consumption	4500 W maximum	
Generator output performance	5.5 kVA unipolar operation; electronic regulation	
Protection fuse	Interior of 20 A at 230 Vac Interior of 40 A at 110 Vac	
Degree of protection (EN 60529) Mechanical strength (EN 50102)	IP54, Class I / Series AR: IP43, Class I IK10 (20 Joules)	
Duty factor	20 to 100% (depending on the fitting); Series AR: 50 to 100% Electronic temperature monitoring of the unit	
Working temperature *Manual*	Informative, with established limits (recommended acc. to ISO 12176-2 from -10 to 40°C)	
Barcode		-20 to 50°C
Display	LCD, 2 lines x 20 characters backlight	
Acoustic warning	Piezoelectric buzzer	
Enter fusion data	Manual	
	Voltage: Multivoltage Time: Up to 5,940 seconds (99 minutes)	
		Automatic
		Barcode acc. to ISO/TR 13950
Front and keys	Silkscreen plastic membrane with tactile push buttons	
Other features	Soft start and message display in case of initial voltage failure	
Power cable	3x2.5 mm^2 (Schuko + French type plug) 4 m long 3x2.5 mm^2 (230V, 16A Blue acc. to EN 60309 type plug) 4 m long 3x4 mm^2 (110V, 32A Yellow acc. to EN 60309 type plug) 4 m long	
Electrofusion cables	1x16 mm^2 , 3 m long (female terminals of diameter 4 mm)	
Scanner		Laser scanner
Connection of scanner and PC		D-Sub 9 pins male
Accessories	Document holder with a set of 4 and 4.7 mm electrofusion adaptors & scanner	
Weight and dimensions	Height: 370 mm; Width: 300 mm; Length: 220 mm Nett weight: 20 kg	

6.1.2 **Generator specifications:**

Frequency	:	50/60 Hz
Output power	:	5.5 kVA (minimum)
Voltage	:	230 Vac/110 Vac
Current	:	20 A for 230 Vac/40 A for 110 Vac
Voltage regulation	:	Preferably electronic

6.2 SIZE AND WEIGHT

6.2.1 **Weights and dimensions**:

Nett weight	:	20 Kg (including cables and accessories)	
Dimensions	:	Height	370 mm
		Width	300 mm
		Length	220 mm
Package exterior dimensions	:	380 x 310 x 230 mm	
Gross approximate weight	:	26 Kg	

6.2.2 **Accessories:**

List of accessories included in the unit:

QTY	DESCRIPTION
1	Document holder
1	User Guide
1	Scanner (**BEAT-2** only)
2	φ 4 mm terminal adaptors
2	φ 4.7 mm terminal adaptors

NOTES